of tabasheer from Dr. F. H. Mallet of the Geological Survey of India, who obtained it at the bazaar of the Calcutta Fair in November of 1888, that the Indian snake stone is evidently tabasheer. Tabasheer is a variety of opal that is found in the joints of certain species of bamboo in Hindostan, Burmah, and South America; it is originally a juice, which by evaporation changes into a mucilaginous state, then becomes a solid substance. It ranges from translucent to opaque in color. I found it either white or bluish white by reflected light, and pale yellow or slight sherry red by transmitted light. Upon fracture it breaks into irregular pieces like starch. As in Tavernier's account of its clinging to the palate and causing water to boil when immersed, it actually has the property of strongly adhering to the tongue, and when put into water emits rapid streams of minute bubbles of air. It has a strong siliceous odor, but after absorbing an equal bulk of water becomes transparent like a Colorado hydrophane described by the writer several years ago before the New York Academy of Sciences.

Although tabasheer is mentioned in nearly all the textbooks, very little of it has reached the United States. It is highly interesting, since we have here an organic product scarcely to be distinguished from a similar opal-like body found by Mr. Arnold Hague in the geysers of the Yellowstone Park. Both tabasheer and the hydrophane were probably what was called "Oculus Beli," "Oculus Mundi," and "Lapis mutabilis" by Thomas Nicol, Robert Boyle, and other writers of the seventeenth century, and "Weltauge" by the Germans.

The great capacity of this substance for absorbing a fluid would undoubtedly render it as efficacious for the purpose of absorbing poison as any other known stone, providing the wound is open enough; and its internal use to-day as a medicine is possibly also due to this property.

Tabasheer, as known among mineralogists, is a corruption of the word tabixir, a name which was used even in the time of Avicenna, the Grand Vizier and body surgeon of the Sultan of Persia in the tenth century. It played a very important part in medicine during the middle ages. As to its origin, Sir David Brewster[1] says that tabasheer is only formed in diseased or injured bamboo joints or stalks.

Guibourt[2] differs from Brewster, inasmuch as he attributes the different rates of growth to the fact that when there is a superabundance of sap the tabersheer is formed from the residuum. More recently, Henry Cecil[3] says, "In the onrush of tropical growth in the young shoot, nature, after flooring the knot, has poured in, as it were, sap and silica sufficient for a normal length and width of stem to the knot next above it. But by some check to the impulse, or by irregularity of conditions, the portion of stem thus provided for is shorter or narrower than intended, and the unused silica is left behind as a sediment, compacted by the drying residuum sap."

This latter view is sustained by Dr. Ernst Huth in his elaborate description of this substance, entitled "Der Tabixir in seiner Bedeutung fur die Botanik, Mineralogie, und Physik; X. Sammlung Naturwissenschaftlicher Vortrage, herausgegeben von Dr. Ernst Huth, Berlin, 1887."

In this article Dr. Huth discusses the name, history, origin, and reputed virtues of this substance with much fullness. In regard to its use in medicine during the middle ages, he quotes a remarkable list of applications to the ills that flesh is heir to.

Here it is cited as a remedy for affections of the eyes, the chest, and of the stomach, for coughs, fevers, and biliary complaints, and especially for melancholia arising from solitude, dread of the past, and fears for the future. Other writers speak of its use in bilious fevers and dysentery, internal and external heat, and a variety of injuries and maladies.

The writer has examined a large number of so-called madstones, and they have all proved to be an aluminous shale or other absorptive substance. But tabasheer possesses absorptive properties to a greater degree than any other mineral substance that I have examined, and it is strange that it has never been mentioned as being used as an antidote. It may be confidentially recommended to the credence of any person who may desire to believe in a madstone.

GEORGE FREDERICK KUNZ.

[1] Edinburgh Philos. Journal, No. 1, p. 147; Philos. Trans., cix., p. 283; and "The Natural History and Properties of Tabersheer," 1828; Edinburgh Journal, viii., p. 288.

[2] Jour. de Pharmacies, xxvii., pp. 81, 161, 252; and Phil. Mag., x., p. 229.

[3] Nature, xxxv., p. 437.

THE PLANT-BEARING DEPOSITS OF THE AMERICAN TRIAS.[1]

THE plant-bearing deposits of the American Trias are, so far as known, confined to two general regions, viz., a series of troughs in the piedmont region of the Atlantic slope extending from Massachusetts to North Carolina, and a great basin or area in the territories of New Mexico and Arizona. The character and structural relations of these rocks have been fully discussed by numerous writers. It is proposed in this paper to examine the evidence of the fossil plants as to their geological position. This evidence may be considered from two points of view; first, as to the relative position of the several basins, areas, or plant-bearing portions; and, second, as to the general relations of the flora as a whole to other floras which resemble it sufficiently to admit of comparison.

In looking at the subject from the first of these two points of view, or that of the American distribution, it is convenient to divide the general terrane into five geographical areas corresponding nearly with so many geological basins, viz., first, that of the Connecticut valley; second, the area that extends with little interruption from the Hudson River to near Charlottesville, Virginia; third, the Richmond coalfield; fourth, the North Carolina coalfield; and, fifth, the western area, which is not as yet sufficiently known to admit of subdivision.

The fossil plants have nearly all been found in the Connecticut valley, the Richmond coalfield, the North Carolina coalfield, and about the copper mines of New Mexico; a few came from New Jersey, Pennsylvania, and Maryland, while only silicified trunks have thus far been discovered in Arizona. All the material that has been found has been carefully studied and as accurately determined as its nature will permit. The greatest abundance of vegetable remains occurs in the Richmond and North Carolina coalfields.

A careful comparison of all the forms shows that out of a total of a hundred and nineteen species eighty-five are confined to some one of the areas above enumerated, leaving only thirty-four that occur in two or more of them. Tables of the distribution of species with full analysis of their relations and significance are given in the paper. As a general result, it is found that none of the basins except that of the

[1] Read by title, by Lester F. Ward, before Section E of the American Association for the Advancement of Science, at Washington, D.C., Aug. 21, 1891; and in full before the Geological Society of America, at the same place, Aug. 24, 1891.

west contains less than thirty-nine per cent of species common to it and some one or more of the other basins, and that one of them, viz., that of New Jersey and Pennsylvania, has seventy-two per cent of its plants common to other basins, while that of North Carolina has fifty-two per cent, and that of Virginia thirty-nine per cent. All who are familiar with the evidence from fossil floras must therefore admit that it is strongly in favor of the general parallelism of the four eastern basins, while the minerals are too scanty to base a safe conclusion upon relative to the great western area with fifteen per cent of its species common to it and the eastern deposits.

Considering the subject from the second point of view above mentioned, or that of the foreign distribution, it is found that forty of the hundred and nineteen species occur in other deposits of the world, while seventeen others are represented elsewhere by closely related forms, giving fifty-seven of what may be termed diagnostic species. Omitting all details as before, it appears that the largest number of these, viz., thirty-two, occur in beds that have been authoritatively referred to the Keuper of Old World nomenclature, the Rhetic coming next, with thirty-one, followed by the Lias with twenty, and the Oolite with nineteen.

The general conclusion, therefore, is that, so far as the evidence from fossil plants goes, the precise horizon, relatively to the European deposits, of our American older Mesozoic plant-bearing rocks must be at the summit of the Triassic system, with their nearest representatives in the Keuper of Lunz in Australia and at Neue Welt near Basle, in Switzerland; while there is also a close affinity in the types to those of the Rhetic of Franconia and South Sweden.

BIRDS IN HIGH GALES.

AT first it seems difficult, says the *London Spectator*, Oct. 31, to believe that the petrels, gifted with such powers of flight that, like their first cousins, the albatrosses, they make the central ocean their chosen home, should so far succumb to the Atlantic storms as to fall wholly under the dominion of the wind, and drift for thousands of miles to unknown and inhospitable shores. But any one who has watched the flight of a "lost" bird in a gale on land may form some idea of the danger to which the petrels are exposed when a hurricane bursts in the Atlantic.

Near Oxford, when the last gale was at its height, the writer was watching the "centre-board" rushing up and down over the floods on Port Meadow, with a strong current and the wind on their quarters; the geese were flying over the flood to avoid the canoes and small craft; and the wind was blowing a full gale from the south-west, with a brilliant sun, occasionally hidden by a white, drifting cloud. Far away to the north was a long-winged bird, beating up against the wind. At one time it rose high in the air, facing the gale; then it descended with a rapid swoop progressing westwards, but at the same time "falling off" still further to the north. It was a young herring gull, its checkered gray-and-white plumage showing clearly in the bright light as it approached. It was easy to conjecture from the gull's flight the power of storms to drive birds from the course which they aim at. The bird's point was clearly westward. It used every shelter and every lull of the wind to make it; but the gale was two powerful, and it appeared that it must either stay on the inhospitable land until the wind dropped, work its way slowly to the west with a rapid drift to the north, or abandon its struggle and drift with the wind.

But all birds seem to have an instinctive knowledge that if they once surrender to the force of the wind, and allow themselves to drift like leaves, there are unknown dangers in store for them. They will hardly ever do so unless to escape pursuit, and then only for a few minutes, when their pace is so marvellously rapid that, in the case of land-birds, a few minutes is sufficient to carry them out of the district they know into others from which they will perhaps never be able to find their way back to the fields which are their native home.

In the gale on Sept. 1 of the present year the writer saw a successful effort made by partridges to avoid the consequences of thus abandoning themselves to the gale. A covey of very strong birds, which had been hatched on the highest part of the Berkshire Downs, was flushed down-wind, and, rising high in the air, the whole brood were carried in a few seconds to the extreme edge of the hill, below which was a sudden fall of some three hundred feet to a country quite unknown to these hill-birds. As they approached the limit of their own district, the partridges made an extraordinary effort to release themselves from the power of the wind, and to avoid being forced over the hill-top. Closing their wings, they sank almost to the ground, and so gained the slight shelter of a low bank. This enabled them to wheel, and so to face the gale. Even then they might not have achieved their object had not a small thorn-bush broken the force of the wind just on the edge of the down. The whole covey used the respite so given, and skimming up almost in single file, they alighted one by one behind the bush, on the extreme limit of their native ground. But recent instances are not wanting in which partridges have been carried out to sea when drifting on the wind. At Sizewell, in Suffolk, nine partridges were blown out to sea, and dropped in the water some four hundred yards from the shore; and in another case thirteen of the "red-legged" variety attempted the flight across the estuary of the Stour, and, falling exhausted, were picked up by some boatmen fishing for "dabs," a welcome and unlooked-for haul.

ASTRONOMICAL NOTES.

THE *English Mechanic* of Oct. 30 is authority for the statement that Dr. Hind, the superintendent of the English Nautical Almanac, will be succeeded by Mr. A. M. W. Downing, one of the chief assistants at the Greenwich Observatory, of which fact mention was made in a recent number of *Science*. The change will take place at the commencement of the coming year.

In *Knowledge* for November are given reproductions of four photographs, taken from a baloon by Mr. C. V. Shadbolt, in England. The several photographs were taken at a height of 500, 1,500, 2,100, and 6,000 feet, respectively. We understand that Mr. Shadbolt is the first to secure at these altitudes a recognizable plate.

Fathers Hagen and Fargis, astronomers connected with the Georgetown, D.C., Observatory, have just published a paper entitled "The Photochronograph and its Application to Star Transits." The aim of these gentlemen has been to secure an instrument that would photograph the transit of a star across the meridian. A reproduction of the transit of Sirius, as photographed, is given as an illustration of the work performed. In brief, the instrument these gentlemen have contrived consists of an electro-magnetic shutter, or "occulting bar," which is secured to the eye-end of the transit instrument. The apparatus is so formed that the current